



**Center for  
Clean Air Policy**

# Policy Options for Reducing Emissions from Power Imports

Stacey Davis  
Center for Clean Air Policy

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# Background

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- One approach for limiting greenhouse gas emissions from the power sector is to use “cap-and-trade.”
- As with other sectors, other approaches to be evaluated include use of benchmarks or intensity targets, financial/technology incentives, and policies and measures.
- This presentation focuses on the design of a cap-and-trade program for California, focusing on policy designs that address emissions associated with California power demand.

# Limitations of a Generation-Based Cap for California

- Generation-based caps are successful in reducing emissions
  - » Acid Rain Trading Program achieved significant emissions reductions (power sector SO<sub>2</sub> emissions reduced from 15.7 to 10.2 million tons between 1990 and 2002) at costs far below what was predicted ex ante
  - » First year of NO<sub>x</sub> Budget Trading Program resulted in reductions of over 30 percent by participating sources
- Several reasons why a generation-based cap may not work well in California:
  - » Significant emissions from imported power would be missed under a cap that covers only California generation.
  - » Programs that cover single states or smaller regional areas and where neighboring states are exempt have a risk for leakage.
  - » There is a more limited (and more costly) set of potential mitigation activities from electric generating sources in California.

# Understanding Leakage

- Leakage = the transfer of power demand and associated emissions to uncapped sources in neighboring states
- *If* a California generation-based cap-and-trade program results in higher costs for in-state generation, generators from out of state will gain a competitive advantage and may increase production. (By the same token, in-state generation would reduce production.)
- While the California cap on generation would be met, increased emissions from higher-emitting out-of-state power can reduce, eliminate or even negate the emissions reductions achieved by the cap.
- Leakage can be minimized by 1) designing the cap to have minimal impacts on electricity prices; or 2) expanding the region subject to the cap to include generation from out-of-state power.

# Three Policy Alternatives for Addressing Emissions from Power Imports

- Multi-state cap-and-trade
  - » Expand cap to cover neighboring states, especially those supplying coal-fired power generation to California
  - » May not be politically feasible in the near-term
- Emission portfolio standard
  - » Power purchased by load-serving entities (LSEs) to meet California demand must meet an output rate (e.g., lb/MWh)
  - » Emissions can increase over time with increases in sales to meet growing state power demand
- Caps on emissions associated with power demand
  - » Cap on total emissions from sales of electricity to California.

# Description of a CA Cap on Emissions Associated with Power Demand

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- Emissions from California demand subject to an absolute limit, irrespective of growth in generation.
- Each LSE must hold allowances for the emissions from power they sell into California, regardless of the location of the generating source.
- Compliance options include:
  - » purchase of emission allowances,
  - » replacement of high-emitting fossil generation purchases with lower or zero-emitting resources, and
  - » investments in energy efficiency.

# Advantages and Disadvantages

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## Advantages

- Limits emissions from California demand.
- May encourage development of new low-/zero-emitting resources and longer-term contracting with cleaner resources.
- Limits the potential for leakage.

## Disadvantages

- Potential for compliance through contract shuffling.
- Challenges in tracking emissions and monitoring compliance.
- Increased potential for problems with power reliability.

# Issue 1: Contract Shuffling

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- A legitimate form of compliance, e.g., an LSE chooses to buy low-emitting gas-fired generation instead of coal
- May want to prevent certain types of shuffling, such as
  - » Sales of the same renewable generation to meet both an out-of-state renewable portfolio standard (RPS) and a California cap
  - » Sales to California that would be technically impossible to deliver to market because aggregate power sales exceed the maximum available transmission capacity



## Issue 2: Tracking Emissions and Monitoring Compliance

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- Actual electrons cannot be tracked as they move through the grid based on physics.
- It is difficult to track power sales. Power from a given unit, plant or company may be sold to one or more LSEs through long-term contracts or via the spot market. Power is often resold.
- Emissions attributes of the power are not currently reported or tracked.

# Issue 3: Power Reliability

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Several issues with power reliability are possible as a result of a cap on emissions associated with power demand:

- Changes in power purchases could strain certain transmission lines that were not previously congested.
- A cap could lead to reduced generation by plants that are relied on for voltage support.
- Risk that insufficient new, clean generation will be built to meet the cap.

# Setting the Cap Level

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- Considerations include cost (cost per ton; total system, energy), emissions reductions and public perception.
- Planned NEMS modeling will help understand the implications of different cap levels.

Example decision rules:

- Maximize mitigation such that costs stay within a reasonable range.
- Encourage all new generation to meet California demand to be low- or zero-emitting.
- No increase in coal-fired power imports.

# Options for Tracking Emissions and Monitoring Compliance

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- Requires development of new tracking system, or significant modifications to WREGIS.
- Currently, WREGIS is designed to be an independent certificates-based system to track and verify renewable energy generation in the west. NE-GIS also tracks emission attributes of electricity sold.
- WREGIS would need to be expanded:
  - » Include all units selling power to the western grid
  - » Include reporting of unit-level CO<sub>2</sub> emissions and the quantity sold to LSEs serving the CA market

# Ideas for Reducing Undesirable Contract Shuffling

- Require emissions attributes certificates to accompany power sales to help avoid unrealistic power sales and to ensure that the same renewable energy is not sold twice.
- Consider an additional study of transmission capability during peak times to prevent sales in excess of what transmission capacity can hold.
- Assume that imports meet a system average emission rate, eliminating the incentive to shuffle contracts. However, this solution runs counter to the interstate commerce clause.

# Approaches to Address Reliability

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- Develop a companion program to encourage penetration of new, low-emitting technologies, provide voltage support and/or address transmission constraints.
- Consider options for providing compliance flexibility, including:
  - » Emissions trading and banking
  - » Offset systems
  - » Long lead times and long (e.g., 5-year) compliance averaging periods
  - » Price caps

# Allowance Allocation

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- Issues are generally similar to those in choosing an allocation method for a generation-based cap.
- One consideration is the level of data reporting required to support an allocation method under a cap on emissions associated with power demand.
  - » Auction and output approaches require data on emissions
  - » Input approach also requires reporting of fuel types and quantities.

# Linking

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- A ton of CO<sub>2</sub> is a ton of CO<sub>2</sub>, and the same kinds of program equivalency should be assessed as in the case of a generation-based cap.
- If California opts to cap emissions associated with power demand, Oregon and Washington State may want to use the same approach to facilitate regional accounting.



# Legal Issues (1)

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- Must meet requirements of the Interstate Commerce Clause
  - » Must demonstrate the requirement serves a legitimate state interest and provides equal treatment to in-state and out-of-state power generation. In general, a cap on emissions associated with power demand will meet these criteria.
  - » Potential issue in use of a system average emission rate for out of state power (not recommended).
  - » Potential bias against out-of-state renewable energy sources in that they cannot be used to meet both an RPS and a CA cap (and in-state renewable energy sources can be used to meet both).

# Legal Issues (2)

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- Preemption by the Federal Energy Regulatory Commission (FERC) under the Federal Power Act.
  - » Cannot infringe FERC jurisdictional authority over transmission and wholesale power transactions.
  - » As designed, the cap meets these requirements by restricting only retail sales.

# Conclusions

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- In California, a cap on emissions associated with power demand has some clear advantages over a cap on generation.
- The success rests on resolving data, monitoring and verification issues.
- Modeling results will indicate how the power system might be expected to react to a cap on emissions associated with power demand, and the overall impact on emissions.